PERFORMANCE OF HEDGE FUND SHORT TRADES IN THE FINNISH STOCK MARKET

Bachelor's Thesis
Juho Kiiski
Aalto University School of Business
Finance
Spring 2017

Performance of hedge fund short trades in the Finnish stock market

Juho Kiiski

Bachelor's Thesis, Finance
Aalto University School of Business

12.4.2017

Abstract

I examine the profitability of hedge fund short trades in Finnish equities. I also study short selling strategies producing abnormally high risk-adjusted returns. I do this by combining Finnish financial supervisory authority's (FIN-FSA) data about short positions that are over 0.5% of the underlying company's market cap with the companies' return and returns of the factor portfolios. The factor portfolios used are Fama and French 3 and Carhart momentum. I find that hedge funds' short trades are able to significantly outperform the market by 7 to 13 percent annually. I also divide the funds by their strategy depending on the amount of view they want to take on an individual company. I find that the funds that generally do not implement stock picking strategies, such as systematic equity strategies do not produce significant positive alphas. However, large wealth management companies' funds are able to produce high positive alphas, as are the funds that generally exploit stock picking strategies, such as dedicated short funds.

Contents

Abbreviations

BAB = Betting against beta

FF3 = Fama and French 3-factor model

FIN-FSA = Finnish financial supervisory authority

HML = High minus low

MKTRF = Market excess return

MOM, WML = Momentum

OMXH = OMX Helsinki stock exchange

RF = Risk free

SE = Standard error

SMB = Small minus big

1 Introduction

I examine hedge fund short trade returns between different strategies and also as a whole. I also study whether the magnitude of the short position affects its performance. My research contributes to a field of studies made about short interest, and also about the performance of hedge funds. I follow the approach of Rapach et al. (2016) indicating that short positions are a strong predictor of the stock market, which also implies that short sellers are sophisticated and more informative than traders on average about the future market movements. This is also in line with the theory that short sellers are able to "take advantage of arbitrage opportunities" and "cause prices to revert to their fundamentals" that is stated by Shleifer and Vishny (1997) and Stambaugh et al. (2012). The abnormal performance of hedge funds has been recognized by Agarwal and Naik (1999) and Stefanova et al. (2014). It has also been argued that hedge funds' outperformance is insignificant (Griffin and Xu, 2009) and that rational hedge funds do not always stabilize the prices to their fundamentals, as seen in the technology bubble, which was studied by Brunnermeier and Nagel (2004).

I study three questions: Firstly, are short traders able to find overvalued companies and make significant risk-adjusted alpha with their short trades. Secondly, which strategies are able to beat the market and the average short trade and thirdly, are larger short positions more informative than the average short trade. Until the 2010's the research about short trades has been, mostly due to data restrictions, about aggregate short interest and its predictive power on future returns. In these papers it has been found that short sellers are able to predict future negative returns (Aitken et al., 1998; Diether et al., 2009; Boehmer et al., 2008). It has also been found that the advantage of short sellers comes from the skill to analyse public information successfully (Engelberg et al., 2012). However, there have not been many studies about individual short trades and it has not been possible to identify the short seller, since the data has not been available. In 2016 Stephan Jank and Esad Smajlbegovic used the new EU data of short positions to find that hedge funds are able to generate high risk-adjusted alphas with the Fama and French (1993) three-factor risk adjustment. They however did not study the performance on a fund strategy level, but mostly as a whole set and with divisions like is the short seller domestic or foreign.

Also Choi et al. (2016) have looked into the short interest of hedge funds. They divided their data to hedge fund and non-hedge fund managers, and found out that short duration short trades executed by hedge funds are much more profitable than the ones that non-hedge funds execute. However, there are problems with the quality of their data due to hedge funds reporting incorrectly on 13F reports which Choi et al. use. These problems are specified in the paper of Agarwal et al. (2013).

It seems that most of these studies have come to a conclusion that hedge funds are able to outperform mutual funds and the average investor and that hedge funds are informed investors. Hedge funds making abnormal returns is in line with the theory of informed traders (Grossman and Stiglitz, 1980) which suggests that arbitrage returns should be made to compensate the cost of gathering information. My research will contribute to these earlier studies by showing how short trades perform in Finland, studying which kind of hedge fund strategies are able to outperform the market with their short trades and examining if the magnitude of the short trade correlates with its return. This shows us which kind of hedge funds are more informative than the average trader, but also which kind of hedge funds' short positions other investors should monitor when building their own portfolios and whether the magnitude of the short trade includes information about the stock's future return.

2 Research question and hypotheses

I study the risk-adjusted returns that hedge funds are able to produce and investigate if they are able to significantly outperform the market. I also compare the hedge funds with each other with division between strategies. The theory around this study suggests that informative traders should be able to exploit arbitrage opportunities to cover the costs from gathering information (Grossman and Stiglitz, 1980). It has been suggested that hedge funds are these informative arbitrageurs (Shleifer and Vishny, 1997). This theory also seems to work in practice; Jank and Smajlbegovic (2016) studied the European data, and found out that hedge funds are able to outperform the market significantly. Considering these information, my first alternative hypothesis can be formulated as:

1) Hedge funds are on average informed traders, and they are able to outperform the market and produce abnormally high risk-adjusted returns with their short positions.

There also may be a difference in the performance of different hedge fund strategies. Funds that employ stock picking strategies, like dedicated short funds, might be able to produce higher returns than the ones that do not employ them. This is again based on the theory of informed traders (Grossman and Stiglitz, 1980) which states that the investors should be paid in relation to the information they gather, and it is likely that dedicated short funds gather the most information about short selling opportunities. Therefore my second alternative hypothesis is formulated as:

2) Hedge funds that employ stock picking strategies are even more informed traders who are able to outperform the market as well as the average hedge fund with their short positions.

3 Data and methodology

I join data from four major sources: Firstly, short positions are from FIN-FSA's data, which gathers all short positions that are over 0.5% of the underlying company's market cap on a daily level. Secondly, daily return data comes from Thomson Reuters. I collect daily return data for my time period for all companies that were sold short on that period. I use a time period between 2012 and 2017 due to the short position data being available for just that period. Thirdly, daily factor portfolio data from Europe comes from Kenneth French's data library and includes the risk-free return (RF), small minus big (SMB), high minus low (HML) and winner minus loser momentum (MOM) portfolios. As the market excess return ($MKTRF$) I use the Finnish return index from Thomson Reuters. The Finnish return index is chosen since my data is Finnish. Fourthly, I use the Lipper-Tass hedge fund database. I use this database when it is possible to sort the funds to groups by their strategies.

3.1 Short data from FIN-FSA

This data became available in late 2012 when the EU adopted Article 9 of Regulation No 236/2012. This article wants to make short positions inside the EU transparent and obligates all investors to disclose short positions over 0.5% of shares outstanding. The short position also has to be reported whenever it surpasses a threshold of 0.1% after this 0.5%, so when it exceeds 0.6%, 0.7% etc. Another interesting fact about this data is that every time when the position goes under this 0.5% after achieving it, it should also be reported. This makes it possible to calculate the real return of the deal, and this is what Jank and Smajlbegovic have done with their data from the whole EU region. These attributes have also created problems in the data. I notice that from many countries, the data only shows a few closed positions. For example in Finland there were about 4 000 deals, and the data shows only a few hundred closed positions. It is highly unlikely that all short sellers would carry their positions even for years, which implies that the data does not have all the closed positions in it. Therefore I test the deals to have multiple durations. For every deal I calculate returns for a day, a week, a month, three months, six months, a year and two years. Therefore the return is not calculated with the real closing date.

Another consideration about this data is the fact about the notifications made about the 0.1% threshold surpasses. This can make my data show the same short trade twice. Let's think about an example: If company A is first sold short by Fund B on 1.1.2016 by the amount of 0.5% and then on 2.1.2016 the amount is 0.6%, the data treats this as a significant new short position, which it might

not be. I study the data, and it seems that no real short positions were triggered twice within a week in the same stock by the same fund. However, in a month's time range, there were already real short positions in the same stock from the same fund, and it is highly unlikely that hedge funds would make two deals based on the same information with such a long time between them. I might also be calculating yearly returns for the same stock for consecutive dates. This makes it so that the two observations are highly correlated with each other, since they have 249/250 dates in common with each other. To take care of this I decide to cluster the data when the following applies: Firstly, the underlying stock is the same and secondly, the short trades are executed within the same week. I decide to use this time period because of the possibility for the funds to open a short position more than one time within a month with completely different information. I also delete all under 0.5% positions from the data, since they should show the close of the short position, but they are not adequately reported in the data to be used for that.

3.2 Daily return data from Thomson Reuters

I gather daily returns for all 40 companies that were sold short in Finland during 2012 to 2017 according to the FIN-FSA data. Then I calculate the returns for all durations and for all companies using this daily data. I make two adjustments to make the data consistent. First, I delete all days in which more than 90% of these companies do not have data on the returns, so I handle those days as non-trading days. Second, I delete the data with stock prices under 0.1EUR. This takes care of illiquidity issues, like with Talvivaara's stock after its trading was ceased. Otherwise the data would show zero-returns due to lack of liquidity.

3.3 Daily factor portfolio data from Kenneth French data library

I gather the daily factor portfolio data from Kenneth French's data library and calculate the returns for all the durations I use for all the factor portfolios. The data includes risk free return, small minus big excess return, high minus low excess return and winner minus loser momentum excess return. Here I use the European level data. I take the market return data from Thomson Reuters as Finnish return index, since the companies I am observing are all Finnish. After this I deduct the risk free return from the market return and companies' returns to get the market and firm specific excess returns. These are then combined with the factor portfolios' excess return data to get the right, day level forward looking returns for all the required factors.

3.4 Hedge fund strategies from Lipper-Tass database

I construct hedge fund strategy groups with the help of Lipper-Tass hedge fund database. I have 140 funds in my data as short sellers for which I gather their strategies from the Lipper-Tass database when it is possible. The ones that are not found in there, I handpick from the fund's website or either from Thomson Reuters or Bloomberg. I use the following division with the fund groups, starting from the one that employs stock picking strategies the least and ending to the one that uses them the most: Group 1 includes the funds that use a convertible arbitrage strategy. These funds do not usually employ stock picking strategies. I get one fund and two short positions in this group, so I drop the group from further examination. Group 2 includes systematic equity strategies. Their stock picking does not have to include information on the underlying company's performance in relation to the market. I got 18 funds in this group with a few hundred short positions. Group 3 is for the funds that I could not reliably put to any of the other strategy groups. This group includes mostly (over 90%) large financial companies' funds which can employ any strategy, like Goldman Sachs and Morgan Stanley funds, but also a few funds that were so resistant to tell their strategies that it was not possible to put them in any of the other groups. There are 70 funds and over 1 800 deals in this sample. In group 4 I have long-short equity strategies that do employ a stock picking strategy, but also short sell with a reason to filter away the market risk from their strategies. Here I have 41 funds and over a thousand deals. Group 5 is for dedicated short strategies that employ stock picking strategies the most, and should make their profits with the individual stock picks. I have 9 funds and about 80 deals in this sample.

3.5 Descriptive data

Table 1 shows descriptive statistics. It seems that the average short trade is able to be more profitable than short selling the market when the deal's duration is over one month, but not itself be profitable (able to produce positive returns) at any duration. This implies that most of these hedge funds would use a long-short strategy, which I cannot validate, since I do not have the information about the long side trades. The use of long-short strategies is however supported by the distribution of strategies from the Lipper-Tass database, Thomson Reuters and Bloomberg.

When looking at the largest short positions' sample it seems that the funds here are able to pick deals better than the average hedge fund on a very short or a very long duration, but they will also require a long-short strategy to be profitable. This implies that large short positions might contain information about the really short term or really long term performance of the underlying company. This

outperformance of largest positions is also in line with the theory (Grossman and Stiglitz, 1980) and empirics (Jank and Smajlbegovic, 2016).

It seems that systematic equity is unable to beat the average deal, or even seems to lose to it. This is in line with the theory and my hypothesis; the funds that are not using stock picking information do not make arbitrage profits. Large wealth management companies' funds seem to beat the market on almost all of the durations, but these funds also require a long-short strategy to be profitable. Perhaps surprisingly, long-short equity seems not to be able to beat the market at any duration. Dedicated short seems to be the only strategy to yield positive returns on an average short trade. These deals are chosen way better than short selling the market, and on some of the durations (one month and three months) the short trades are able to yield larger profits than the market on long side trades. This is in line with my hypothesis number 2; it really seems that the dedicated short funds are able to short sell profitably and yield arbitrage profits for the information they are gathering. They also seem to be the only ones to be able to be profitable with only the short side trade.

Table 1

The table below shows the number of trades, funds and securities in the broad sample (containing all the short positions), narrow sample (containing the short positions which had data for all the factor portfolios since FF3 data was only available until 6/2016), short positions over 2% of the underlying company's market cap and all the strategy groups excluding number 1, since it only had one fund, one company and two deals in it. The table also includes the average annualized return of every sample and the market (the market from both days that some stocks were sold short significantly in Finland, both from the broad sample and narrow sample and all trade days) from all the time periods. With these one is able to analyse which strategies require long-short portfolios and which can yield profits by themselves. There are no substantial differences between the narrow and the broad samples. Therefore the table only shows the data from the broad sample regarding the strategy groups, since it is more comprehensive than the narrow sample.

	Broad sample	Narrow sample	Shorts over 2%	Strategy basket 2	Strategy basket 3	Strategy basket 4	Strategy basket 5	Market on short dates (Broad)	Market on short dates (Narrow)	Market on all dates 2012-2017
Number of trades	3362	2989	303	381	1865	1037	77	N/A	N/A	N/A
Number of funds	139	126	19	18	70	41	9	N/A	N/A	N/A
Number of securities	40	36	13	16	37	24	9	N/A	N/A	N/A
Average annual return (1 day), %	-23.9	-19.2	-2.6	-24.6	-24.0	-30.0	60.2	24.4	24.9	20.0
Average annual return (1 week), %	-24.0	-17.6	3.0	-72.6	-19.8	-20.3	16.6	24.1	22.9	20.3
Average annual return (1 month), %	-24.5	-18.6	-58.7	-40.5	-21.7	-29.2	36.5	23.5	23.2	21.1
Average annual return (3 months), %	-15.3	-13.5	-27.7	-11.4	-12.6	-24.7	17.2	17.5	18.2	16.5
Average annual return (6 months), %	-14.2	-14.0	-13.0	-20.6	-9.2	-21.9	7.9	16.0	15.9	16.4
Average annual return (1 year), %	-12.5	-12.5	-6.4	-34.1	-5.5	-17.1	2.5	15.3	15.3	15.8
Average annual return (2 years), %	-11.9	-11.9	-9.4	-24.7	-6.2	-16.0	-9.9	17.4	17.4	16.6

4 Performance

In this chapter I cover my results. First I report the performance of all hedge funds' short positions. Then I cover the results of the strategy groups and finally conclude with the performance of the largest short deals. I made three key findings. Firstly, hedge funds' short trades are on average able to beat the market, but they will require a long side trade with them to be profitable. Secondly dedicated short funds as well as funds of large wealth management companies are able to beat the average hedge fund, and the short trades of dedicated short are even able to beat the market with only the short side trade. Thirdly, largest short positions seem to be able to beat the average short trade on long and short durations, though not on medium term.

4.1 All hedge funds

Table 2 below shows the FF3 and FF3 + Carhart momentum (Carhart, 1997) risk-adjusted returns of all short trades over 0.5% of the underlying company's market cap. All the models cluster the standard errors (SE) (see Cameron and Miller, 2015 for more specific explanation of clustering SEs) of all deals that are done in the same company and within the same week. F-statistic also accounts for the clustering of the model to make the F-statistic robust. The returns are calculated for the periods of a day, a week, a month, three months, six months, a year and two years. The returns are then regressed using the following formulae:

$$R_{tFF3Mom} = \alpha_t + \beta_{1,t}MKTRF + \beta_{2,t}SMB + \beta_{3,t}HML + \beta_{4,t}MOM + \varepsilon_t$$

$$R_{tFF3} = \alpha_t + \beta_{1,t}MKTRF + \beta_{2,t}SMB + \beta_{3,t}HML + \varepsilon_t$$

Where R is the underlying deal's excess return, t is the forward looking time period, $MKTRF$ is the excess return of the market portfolio, SMB is the excess return of the small minus big portfolio, HML is the excess return of the high minus low portfolio and MOM is the excess return of the winner minus loser momentum portfolio. SMB, HML and MOM are extracted from the European data in Kenneth French's data library. $MKTRF$ is the excess return of the Finnish return index from Thomson Reuters during the period. The excess returns are calculated as:

$$R_{iExcess} = R_i - Rf$$

Where R_i is return of the factor portfolio and Rf is the risk free return from French's data library, where the risk free rate is the German one-month treasury bill rate.

Table 2 shows that returns load on factor portfolios in most of the time periods. From these we can see that the funds on average short sell companies with high betas (around 1.2 and 1.3), which shows an intention to betting against beta (BAB) strategy (See Frazzini and Pedersen, 2014 for introduction to BAB). It also seems that the funds employ the momentum strategy (see Grinblatt, Titman and Wermers, 1995 and Carhart, 1997 for introduction to momentum) and short sell loser stocks in it pretty heavily. It refers to the use of the momentum strategy, that almost all of the significant alphas disappear when the momentum factor is added to the model. This is in line with Baltzer et al. (2015) that informed investors, such as hedge funds, use the momentum strategy. It seems that only on a year's time horizon the funds are able to produce significant positive alphas with the FF3 + Carhart momentum risk adjustment.

When we use the pure FF3 risk adjustment, the market beta seems to remain around 1.2. However, HML factor becomes significant and it shows that the funds mostly short sell companies with high market-to-book values. The alphas become significant in more cases, which again implies that the funds are using momentum strategies. It seems that the funds are able to produce significant positive alphas of annualized 7 – 13 percent depending on the time period, but only on time periods from one month to one year. This implies that hedge funds are able to predict future returns for this 1-month to 1-year period and not on a very short (a day or a week) or a very long period (two years). This might reveal the duration of hedge funds' average short positions, and it would be intuitive that in these momentum strategies the holding periods are medium term. Since I do not have the closing dates of these deals, I am not able to investigate this average duration more thoroughly. These results are in line with previous studies (Jank and Smajlbegovic, 2016; Choi et al., 2016) both with the time periods and the use of BAB and MOM strategies.

These deals are however on average only able to beat the market when using a long-short strategy, since the average short trade still produces negative raw returns, though less negative than short selling the market portfolio. On the other hand, we can say that on average, the investors should not choose the significantly short sold stocks in their own portfolios as long positions, since being long in the market portfolio pays better.

Table 2, Full sample

This table shows the factor loadings and t-statistics for each factor portfolio and the alpha. Also robustness metrics are included in the table.

Full sample (FF3 + Carhart momentum)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	2.54	1.27	4.47	-0.45	-1.98	16.22**	3.62
	(0.18)	(0.13)	(0.85)	(-0.14)	(-0.63)	(2.53)	(0.14)
MKTRF	-1.31***	-1.21***	-1.34***	-1.24***	-1.31***	-0.8***	-0.54
	(-16.44)	(-16.2)	(-13.62)	(-12.4)	(-10.97)	(-3.73)	(-0.73)
SMB	-0.52***	-0.44***	-0.63***	-1.4***	-1.96***	-0.05	3.06
	(-2.89)	(-2.58)	(-2.87)	(-5.76)	(-6.55)	(-0.08)	(1.46)
HML	-0.51***	-0.23	-0.03	0.21	0.5**	-0.02	-0.48
	(-3.44)	(-1.12)	(-0.14)	(1.06)	(2.29)	(-0.1)	(-0.41)
WML	0.53***	0.64***	0.82***	1.59***	2.15***	-0.61	-0.96
	(4.12)	(3.94)	(4.84)	(10.36)	(10.25)	(-1.15)	(-0.88)
R^2	25.91	26.06	25.72	29.51	20.93	6.81	6.28
N	2988	2974	2946	2839	2583	2082	1255
F	134.67	77.18	58.78	82.7	65.74	8.13	4.44
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N of unique stocks	36	36	36	36	35	32	25

Full sample (FF3)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	7.07	6.87	10.91**	7.06**	11.19***	12.98**	-12.25
	(0.48)	(0.71)	(2.08)	(1.99)	(3.24)	(2.32)	(-0.51)
MKTRF	-1.27***	-1.18***	-1.29***	-1.13***	-1.03***	-0.89***	-0.4
	(-16.53)	(-15.82)	(-13.04)	(-10.21)	(-7.68)	(-4.24)	(-0.53)
SMB	-0.46***	-0.28*	-0.33	-0.17	-0.32	-0.62	3.12
	(-2.59)	(-1.74)	(-1.55)	(-0.71)	(-1.12)	(-1.62)	(1.47)
HML	-0.85***	-0.64***	-0.48***	-0.65***	-0.06	0.06	-0.72
	(-5.42)	(-3.67)	(-2.61)	(-3.62)	(-0.29)	(0.26)	(-0.61)
R^2	25.2	24.83	23.62	21.56	11.07	6.59	6.11
N	2988	2974	2946	2839	2583	2082	1255
F-value	175.79	95.25	72.1	48.89	27.53	10.60	5.67
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N of unique stocks	36	36	36	36	35	32	25

4.2 Systematic equity

Table 3 shows the models' results with the data sample from systematic equity. This strategy does not require picking stocks that outperform the market. My hypothesis is that these funds do not make alphas as high as the average hedge fund. When looking at the return data without risk adjustments, it seems that the hypothesis is in place and the systematic equity funds are unable to pick better short trades than it would have been to just short sell the market.

The risk-adjusted data shows that systematic equity short sells stocks with even higher betas than the average fund (betas on average between 1.4 and 1.9 depending on the time frame), which implies that they are pursuing the betting against beta strategy even more aggressively than the average hedge fund. Also Jank and Smajlbegovic (2016) found that hedge funds use the BAB strategy in their short trades, so this finding is in line with previous research. It also seems that they are exploiting the momentum strategy a bit more aggressively than the average hedge fund. The FF3 model without the momentum factor also shows that these funds are short selling high market-to-book companies more than the average fund. This phenomenon however disappears when including the momentum factor in the model.

The risk-adjusted data indicates that these hedge funds are unable to beat the market with these risk adjustments, since the alphas are mostly insignificant, and even when significant, they are negative (duration of 6 months). This is in line with my hypothesis number 2; since these funds do not trade with stock picking information, they also do not produce abnormal returns with these short positions.

Table 3, Systematic equity

This table shows the factor loadings and t-statistics for each factor portfolio and the alpha. Also robustness metrics are included in the table.

Systematic equity (FF3 + Carhart momentum)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	-29.92	-25.15	-1.58	-11.45	-25.25***	12.58	33.32
	(-0.75)	(-1.19)	(-0.11)	(-1.32)	(-3.75)	(1.09)	(0.86)
MKTRF	-1.39***	-1.51***	-1.88***	-1.57***	-1.75***	-1.79***	-3.99***
	(-9.17)	(-7.15)	(-8.9)	(-6.59)	(-8.93)	(-4.96)	(-3.22)
SMB	0.02	-0.62	-1.39**	-1.21**	-2.28***	-2.46**	0.12
	(0.04)	(-1.46)	(-2.38)	(-2.42)	(-4.56)	(-2.49)	(0.03)
HML	-0.2	-0.29	-0.32	-0.97*	-1.49***	-0.71*	1.22
	(-0.51)	(-0.5)	(-0.76)	(-1.75)	(-3)	(-1.69)	(0.59)
WML	1.05***	1.27***	1.38***	1.76***	2.6***	0.29	1.61
	(2.83)	(3.03)	(3.64)	(4.32)	(6.69)	(0.31)	(0.88)
R^2	29.74	36.72	37.68	44.32	53.25	38.49	49.51
N	354	354	352	342	300	180	81
F	29.42	19.48	27.43	40.18	61.27	13.29	18.76
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N of unique stocks	16	16	16	16	14	14	13

Systematic equity (FF3)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	-26.75	-22.58	-1.16	-13.7	-19.93**	14.35	50.04
	(-0.65)	(-1.03)	(-0.08)	(-1.37)	(-2.52)	(1.5)	(1.56)
MKTRF	-1.36***	-1.47***	-1.78***	-1.36***	-1.27***	-1.76***	-4.16***
	(-9.18)	(-6.83)	(-8.11)	(-5)	(-5.02)	(-5.09)	(-3.29)
SMB	0.04	-0.41	-0.6	0.34	0.17	-2.19***	0.4
	(0.08)	(-0.96)	(-1.04)	(0.53)	(0.28)	(-3.44)	(0.12)
HML	-1.1**	-1.5***	-1.48***	-2.39***	-2.66***	-0.73*	1.65
	(-2.23)	(-3.01)	(-3.15)	(-5.44)	(-5.84)	(-1.76)	(0.81)
R^2	28.08	33.5	34.1	38.56	41.77	38.79	49.54
N	354	354	352	342	300	180	81
F-value	36.83	23.11	30.63	34.8	30.47	17.65	23.69
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N of unique stocks	16	16	16	16	14	14	13

4.3 Large wealth management companies' funds

Table 4 shows the models' results with the data sample from strategy group 3. This strategy group contains the residual of the funds in my data; meaning that I put here everything that I was unable to put in any of the other groups. This group mostly contains large wealth management companies', like Goldman Sachs and Morgan Stanley, funds which can employ any kind of strategy. I find that over 90% of the funds in this basket are these large wealth management companies' funds, and this is great enough of a number to generalize this attribute to the whole group.

From the raw return data we can see that the large wealth management companies' funds are able to beat the market, but they however require a long-short strategy to perform because the return of the average short trade is still negative, even though less negative than short selling the market portfolio. The risk-adjusted models show that betting against beta strategy seems to have a smaller role in these funds, but it still seems to be a trend to mostly short sell securities with high betas (in range of 1.1 and 1.25 in this sample). The winner minus loser factor seems again to be very high, which shows that these funds use momentum strategy and short sell the loser stocks. This seems to be common for all of these strategy groups and is aligned with Baltzer et al. (2015), who state that informed investors are the users of momentum. The alpha seems to be quite high and consistent in the FF3 model, but when adding the momentum factor, the alpha diminishes from all durations except one year. The FF3 alphas seem quite high, between 7 and 16 percent annually.

To sum up, it seems that these funds mostly trade with betting against beta and winner minus loser momentum strategies, but on a one-year time period, it seems that they are able to produce abnormal alphas even with the FF3 + Carhart momentum risk adjustment.

Table 4, Large wealth management companies' funds
This table shows the factor loadings and t-statistics for each factor portfolio and the alpha. Also robustness metrics are included in the table.

Large wealth management companies' funds (FF3 + Carhart momentum)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	3.45	3.36	3.25	1.62	1.77	21.03***	27.63
	(0.21)	(0.31)	(0.55)	(0.49)	(0.53)	(3.89)	(1.35)
MKTRF	-1.19***	-1.12***	-1.25***	-1.21***	-1.09***	-0.65***	-0.38
	(-15.85)	(-14.02)	(-12.31)	(-11.95)	(-8.28)	(-3.21)	(-0.64)
SMB	-0.43**	-0.35*	-0.5**	-1.29***	-1.38***	0.69	2.15
	(-2.29)	(-1.85)	(-2.15)	(-4.73)	(-3.87)	(1.23)	(1.07)
HML	-0.67***	-0.38*	0.16	0.43**	0.83***	0.16	-0.26
	(-3.63)	(-1.84)	(0.73)	(2.23)	(4.45)	(0.66)	(-0.27)
WML	0.51***	0.41**	0.86***	1.57***	1.92***	-0.97**	-2.85***
	(3.37)	(2.39)	(4.71)	(10.37)	(9.33)	(-2.35)	(-2.83)
R^2	27.33	100	25.79	32.52	21.06	7.52	5.90
N	1594	1585	1560	1493	1346	1061	597
F	94.97	170530872048.06	48.62	67.99	40.82	11.94	5.35
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N of unique stocks	32	32	32	32	29	26	17

Large wealth management companies' funds (FF3)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	7.32	7.06	10.13*	8.61**	11.19***	15.83***	-12.72
	(0.44)	(0.67)	(1.73)	(2.18)	(3.02)	(2.98)	(-0.65)
MKTRF	-1.15***	-1.11***	-1.19***	-1.11***	-0.8***	-0.8***	0
	(-16.15)	(-13.92)	(-11.54)	(-9.83)	(-5.77)	(-4.24)	(0)
SMB	-0.37**	-0.25	-0.17	0	0.27	-0.19	2.12
	(-2.04)	(-1.35)	(-0.73)	(-0.01)	(0.84)	(-0.48)	(0.99)
HML	-1.03***	-0.66***	-0.34*	-0.45**	0.22	0.3	-0.87
	(-5.68)	(-3.54)	(-1.75)	(-2.46)	(1.19)	(1.26)	(-0.99)
R^2	26.55	100	23.37	23.69	10.26	6.69	3.15
N	1594	1585	1560	1493	1346	1061	597
F-value	126.94	214013452460.49	57.48	46.71	24.35	13.38	2.68
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.00	0.05
N of unique stocks	32	32	32	32	29	26	17

4.4 Long-short equity

Table 5 represents the results from long-short equity strategies, which should be able to perform with short trades that have negative returns, but less negative than short selling the market. When examining the data without the risk adjustments, it seems that these deals are unable to outperform the market. This might however be about the risk profile of the deals executed by long-short equity funds.

The risk-adjusted data shows that the deals really have at least more market risk than the average deal (betas mostly between 1.1 and 1.4). This indicates that the funds are using the betting against beta strategy quite aggressively. It seems that this is very popular among hedge funds' short trades. The small minus big factor seems mostly significant, and it shows that these funds mostly short sell small companies. This might however be about the characteristics of Finnish companies, since OMXH as basis, the companies are really quite large (average market cap over EUR 4 billion). The winner minus loser factor shows again that the momentum strategy is used and the funds short sell loser stocks. Over the average market risk (high betas) however does not seem to be enough to make these deals profitable since, though the alphas are mostly positive, they seem to remain mostly insignificant and at least these deals seem to lose to the average hedge fund short trade. This is against my hypothesis number 2, but it might also be so that the large wealth management companies' funds are able to outperform the smaller hedge funds even when they are trading in the smaller hedge funds' core business, since they can invest more in data gathering and therefore produce even larger abnormal arbitrage returns. This outperformance of larger funds was also discovered by Jank and Smajlbegovic (2016).

Table 5, Long-short equity

This table shows the factor loadings and t-statistics for each factor portfolio and the alpha. Also robustness metrics are included in the table.

Long-short equity (FF3 + Carhart momentum)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	8.25	6.06	5.58	-1.46	-2.53	9.17	-58
	(0.42)	(0.45)	(0.81)	(-0.36)	(-0.63)	(0.91)	(-1.23)
MKTRF	-1.43***	-1.24***	-1.29***	-1.18***	-1.34***	-0.81**	0.2
	(-8.07)	(-11.08)	(-8.7)	(-8.53)	(-8.28)	(-2.51)	(0.2)
SMB	-0.76**	-0.44*	-0.7**	-1.85***	-2.38***	-0.67	4.15
	(-2.17)	(-1.71)	(-2.34)	(-5.2)	(-6.48)	(-0.84)	(1.54)
HML	-0.33	-0.09	-0.24	0.36	0.62**	-0.09	-1.68
	(-1.55)	(-0.33)	(-0.85)	(1.31)	(1.96)	(-0.28)	(-1.01)
WML	0.34**	0.62***	0.45**	1.28***	1.85***	-0.25	0.56
	(1.98)	(2.7)	(2.04)	(6.14)	(6.91)	(-0.32)	(0.44)
R^2	28.33	22.64	21.11	21.32	15.46	4.85	5.78
N	965	962	959	929	869	781	525
F	56.41	36.54	25.48	30.23	28.93	2.93	3.37
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.02	0.01
N of unique stocks	23	23	23	23	23	22	20

Long-short equity (FF3)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	12.27	12.57	9.55	6.59	11.89***	7.89	-40.16
	(0.62)	(0.92)	(1.32)	(1.49)	(2.78)	(0.94)	(-1.01)
MKTRF	-1.41***	-1.19***	-1.27***	-1.11***	-1.16***	-0.85**	0.11
	(-8.14)	(-10.61)	(-8.63)	(-7.71)	(-6.75)	(-2.54)	(0.1)
SMB	-0.7**	-0.27	-0.6**	-1.04***	-1.36***	-0.91*	4.09
	(-2.06)	(-1.12)	(-2.1)	(-3.14)	(-4.27)	(-1.78)	(1.5)
HML	-0.49**	-0.39	-0.42	-0.19	0.42	-0.05	-1.53
	(-2.44)	(-1.6)	(-1.62)	(-0.79)	(1.36)	(-0.16)	(-0.9)
R^2	28.05	21.66	20.53	16.17	9.60	4.94	5.88
N	965	962	959	929	869	781	525
F-value	75.7	41.5	32	20.08	15.89	3.76	4.24
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.01	0.01
N of unique stocks	23	23	23	23	23	22	20

4.5 Dedicated short

In Table 6 we have the results of dedicated short strategies. The amount of data is limited in this sample (about 70 deals, nine funds and under ten companies). This makes the robustness metrics a bit lower (all the F-statistics do not fit within the 95% confidence level, R^2s are a bit lower than in the other groups) than in the other samples. The non-risk-adjusted returns of dedicated short show that the average deal is even able to produce higher returns with the pure short position than being long in the market portfolio in some durations (one to three months), which implies that these short trades do not even require a long side deal with them to be profitable.

It is more challenging to interpret the risk-adjusted results because of the amount of data, but we can still see a slight trend to betting against beta strategies. This is however not as consistent as it is in the other strategy groups. The results seem to be loading on the momentum factor, which shows that the funds are exploiting the winner minus loser momentum strategy quite aggressively. This seems to be the main way to make profits for these funds, since the alphas seem to diminish in the model that includes the Carhart momentum. This is in line with Baltzer et al. (2015) who state that informed investors use the momentum strategy. However the performance on a short time period seems abnormal (between a day and a month), even with the momentum risk adjustment, though the alphas are insignificant in other than the one-month period. In the plain FF3 model, it seems that these deals are highly profitable from 1 day to 6 months, though the alpha is only significant in the one month and 6 month durations.

To sum this up, these funds are using the same betting against beta and winner minus loser strategies as other hedge funds, but they are also able to produce high annualized alphas on short time periods, more accurately between 1 day and one month when using the FF3 + Carhart momentum risk adjustment. This is in line with my hypothesis number 2; informed investors should make abnormal profits with their costly information.

Table 6, Dedicated short

This table shows the factor loadings and t-statistics for each factor portfolio and the alpha. Also robustness metrics are included in the table.

Dedicated short (FF3 + Carhart momentum)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	173.46	72.79	54.66*	-6.24	15	-81.23	47.04
	(0.6)	(0.91)	(1.75)	(-0.3)	(0.43)	(-1.49)	(0.37)
MKTRF	-1.32***	-1.02**	-0.97**	-0.29	-1.92**	3.58*	-3.76
	(-3.04)	(-2.17)	(-2.47)	(-0.38)	(-2.16)	(1.74)	(-1.07)
SMB	-1.44	-0.45	0.27	-0.06	-5.75***	2.93	4.72
	(-1.2)	(-0.6)	(0.24)	(-0.04)	(-2.95)	(0.8)	(0.25)
HML	-0.42	0.69	-0.42	-1.07	0.19	-4.21**	3.76
	(-0.43)	(0.96)	(-0.75)	(-1.12)	(0.15)	(-2.53)	(0.74)
WML	-0.25	1.26**	1.14*	2.33***	3.33**	-0.66	1.95
	(-0.18)	(2.04)	(1.85)	(3.08)	(2.26)	(-0.24)	(0.35)
R^2	0	3.05	27.45	22.20	23.37	7.64	7.21
N	70	70	70	70	63	55	48
F	4.48	2.35	6.17	4.04	3.33	2.31	2.07
Pr(F)	0.00	0.06	0.00	0.01	0.02	0.07	0.1
N of unique stocks	8	8	8	8	7	6	5

Dedicated short (FF3)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	159.19	87.4	76.46**	15.78	81.66***	-82.64	76.24
	(0.52)	(1)	(2.39)	(0.66)	(2.66)	(-1.56)	(0.9)
MKTRF	-1.34***	-0.97*	-0.91**	-0.08	-2.05**	3.43*	-4.38
	(-3.51)	(-1.98)	(-2.29)	(-0.1)	(-2.35)	(1.71)	(-1.3)
SMB	-1.45	-0.26	0.4	1.23	-4.13**	2.09	0.84
	(-1.22)	(-0.33)	(0.35)	(0.73)	(-2.16)	(0.87)	(0.05)
HML	-0.3	0.15	-0.98*	-2.02*	-0.15	-4.12**	4.42
	(-0.39)	(0.23)	(-1.99)	(-1.97)	(-0.12)	(-2.56)	(0.94)
R^2	0.99	1.25	25.11	11.32	17.14	9.27	8.82
N	70	70	70	70	63	55	48
F-value	4.53	1.34	6.04	1.94	2.40	3.24	2.68
Pr(F)	0.01	0.27	0.00	0.13	0.08	0.03	0.06
N of unique stocks	8	8	8	8	7	6	5

4.6 Largest short positions

Table 7 shows the results of a sample that contains only short positions that are over 2% of the underlying company's market value. I study this to see if the magnitude of the short position is a factor that tells something about the position's performance. It could be so that the size of the position tells about the certainty of the hedge fund that the underlying company is overvalued. This would indicate that the larger short trades should be even more profitable than the average short trade.

When examining the non-risk-adjusted results, it seems that the larger deals are able to beat the average short trade in very short (one day and one week) and very long durations (six months and one year). However, on medium term (one month to three months) it seems that these deals are losing to the average short trade. This implies that either these deals are made for a very long or a very short time period, or that they are not performing better than the average short trade.

The risk-adjusted results show that these funds bet against beta (betas between 1.2 and 1.7 in 12/14 tests). It seems that this strategy is exploited more aggressively in these large trades than in the average short trade. The winner minus loser factor loading shows that also the momentum strategy is exploited more aggressively with these large deals than with the average deal (values of 0.8 to 3.6 compared to 0.5 to 2). The alphas are significant only on the one-year time period but there they seem to be higher than in the average short trade. We can also see high but statistically insignificant alphas in the short time periods, more accurately from one day to one week.

To recap, it seems that the large deals exploit the betting against beta and the winner minus loser momentum strategies more aggressively than the average deal. It also seems that these deals are able to produce higher risk-adjusted alphas on very short (one day to one week) and very long (one year) durations, however only the one year alpha being significant. These deals seem to lose to the average short trade on medium term (from one month to three months.)

Table 7, Largest short positions

This table shows the factor loadings and t-statistics for each factor portfolio and the alpha. Also robustness metrics are included in the table.

All short positions over 2% of the underlying company market cap (FF3 + Carhart momentum)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	26.2	28.55	-13.37	-23.76**	-21.86*	30.12**	14.76
	(0.62)	(0.92)	(-0.89)	(-2.39)	(-1.93)	(2)	(0.29)
MKTRF	-1.35***	-1.21***	-1.36***	-0.9***	-1.71***	-1.76***	-1.42
	(-6.72)	(-6.53)	(-6.14)	(-4.27)	(-4.58)	(-3.14)	(-0.96)
SMB	-1**	-1.2**	-1.17*	-1.31*	-1.69**	-1.67	5.04
	(-2.13)	(-2.42)	(-1.89)	(-1.75)	(-2.01)	(-1.09)	(1.04)
HML	-0.44	0.62*	0.13	0.3	0.97	1.44**	-0.16
	(-0.96)	(1.8)	(0.32)	(0.64)	(1.47)	(2.34)	(-0.06)
WML	0.79*	1.35***	1.07***	2.55***	3.62***	0.43	0.32
	(1.95)	(3.81)	(2.75)	(7.91)	(7.48)	(0.37)	(0.13)
R^2	24.1	24.69	26.6	32.18	27.19	6.1	10.01
N	271	268	265	250	228	204	142
F	14.93	14.47	13.31	30.77	19.49	2.82	3.09
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.03	0.02
N of unique stocks	11	11	11	11	10	9	7

All short positions over 2% of the underlying company market cap (FF3)

	Daily	Weekly	Monthly	3 month	6 month	Yearly	2 year
α	23.71	48.11	-3.52	1.01	18.98	31.26**	20.48
	(0.56)	(1.49)	(-0.23)	(0.09)	(1.48)	(2.21)	(0.48)
MKTRF	-1.32***	-1.16***	-1.25***	-0.94***	-1.34***	-1.66***	-1.51
	(-6.67)	(-6.02)	(-5)	(-3.76)	(-2.74)	(-3.07)	(-0.97)
SMB	-1.03**	-1.08**	-1	-0.44	-0.17	-1.17	4.74
	(-2.18)	(-2.02)	(-1.54)	(-0.47)	(-0.18)	(-1.18)	(0.92)
HML	-0.94**	-0.04	-0.4	-0.35	0.48	1.35**	-0.04
	(-2.06)	(-0.11)	(-1.06)	(-0.67)	(0.56)	(2.2)	(-0.02)
R^2	22.58	18.98	19.79	13.13	9.77	6.46	10.64
N	271	268	265	250	228	204	142
F-value	19.94	12.28	10.01	8.23	4.83	3.57	4.11
Pr(F)	0.00	0.00	0.00	0.00	0.00	0.01	0.01
N of unique stocks	11	11	11	11	10	9	7

5 Conclusion

Hedge funds are on average able to choose companies that produce higher returns in short positions than short selling the market portfolio on time periods between one month and one year, but they are not on average able to find short trades with positive raw returns. This implies that the funds are perhaps using the short trades to hedge away the market risk and use long-short strategies to yield high risk-adjusted returns. It also seems that the funds are on average able to produce high FF3 risk-adjusted alphas, though some of the statistical significance disappears when adding the winner minus loser momentum factor in the model. This is in line with my hypothesis number 1 and the theory (Grossman, 1981) that informed traders make abnormal profits with their costly information. It seems that the funds are exploiting betting against beta and winner minus loser momentum strategies to achieve these high risk-adjusted returns. This is in line with Baltzer et al. (2015) who state that informed investors use the momentum strategy.

The division to strategy groups reveals that the funds that generally do not employ stock picking strategies, like systematic equity, seem to not be able to pick stocks that would perform worse than the market. It seems that the hedge funds that are able to produce the highest risk-adjusted and non-risk-adjusted returns are dedicated short funds. These funds seem to be the only ones that are able to on average produce positive returns with only the short side trade, and within some time periods (one to three months) are even able to beat the market's long position's return by raw returns with just the short side trade. The other high performing funds are large wealth management companies' funds, which can employ any strategy. These funds are able to choose short positions that are better than short selling the market. They are not however able to choose deals that on average would produce positive raw returns on the short side. This implies that these funds have to use a long-short strategy to yield the profits they want, and also use the short side trades to hedge away the market risk. I also notice that the funds in these strategy groups use the winner minus loser momentum and betting against beta strategies. However the alphas of the dedicated short funds still remain high (though mostly insignificant due to the low amount of data in the sub-sample) when taking the aforementioned strategies to consideration. These findings support my hypothesis number 2 and the theory that the informed investors using costly information are able to yield arbitrage returns (Grossman, 1981).

The largest short positions relative to the market value of the company seem to yield higher profits than the average short trade on very short (one day to one week) or long (one year) time periods, but not on the medium term periods. These deals exploit the winner minus loser momentum and betting against beta strategies even more aggressively than the average fund.

The results can be summarized into three key findings. Firstly, hedge funds are on average able to produce high risk-adjusted returns with their short trades and beat the market with them, secondly, dedicated short funds as well as funds of large wealth management companies are able to execute better short side trades than the other hedge funds and thirdly, larger short positions yield higher profits on short and long (though not on medium term) durations, which shows that funds short sell more aggressively when having more significant information about the underlying company. The funds seem to be able to make high risk-adjusted returns with mostly betting against beta and winner minus loser momentum strategies, though the alpha still remains significant in some cases when considering these strategies. These imply that when choosing their own portfolio, other investors should evade the securities that hedge funds are short selling, especially the ones that are sold short by either large wealth management companies' funds or dedicated short funds. It could also be a fine strategy to follow these short positions to yield high risk-adjusted returns since they are reported on a daily basis in the EU.

References:

Agarwal, V., Fos, V. and Jiang, W., 2013. Inferring reporting-related biases in hedge fund databases from hedge fund equity holdings. Management Science, 59(6), pp.1271-1289.

Agarwal, V. and Naik, N.Y., 1999. Multi-period performance persistence analysis of hedge funds. Journal of Financial and Quantitative Analysis, 35(3), 327–342.

Aitken, M.J., Frino, A., McCorry, M.S. and Swan, P.L., 1998. Short sales are almost instantaneously bad news: Evidence from the Australian Stock Exchange. The Journal of Finance, 53(6), pp.2205-2223.

Baltzer, M., Jank, S. and Smajlbegovic, E., 2015. Who trades on momentum?. Deutsche Bundesbank Discussion Paper.

Boehmer, E., Jones, C.M. and Zhang, X., 2008. Which shorts are informed?. The Journal of Finance, 63(2), pp.491-527.

Brunnermeier, K and Nagel, S., 2004. Hedge funds and the technology bubble. The Journal of Finance, 59(5), pp.2013-2040.

Cameron, A.C. and Miller, D.L., 2015. A practitioner's guide to cluster-robust inference. Journal of Human Resources, 50(2), pp.317-372.

Carhart, M.M., 1997. On persistence in mutual fund performance. The Journal of finance, 52(1), pp.57-82.

Choi, J., Pearson, N.D. and Sandy, S., 2016. A First Glimpse into the Short Side of Hedge Funds.

Diether, K.B., Lee, K.H. and Werner, I.M., 2009. Short-sale strategies and return predictability. Review of financial Studies, 22(2), pp.575-607.

Engelberg, J.E., Reed, A.V. and Ringgenberg, M.C., 2012. How are shorts informed?: Short sellers, news, and information processing. Journal of Financial Economics, 105(2), pp.260-278.

Fama, E.F. and French, K.R., 1993. Common risk factors in the returns on stocks and bonds. Journal of financial economics, 33(1), pp.3-56.

Frazzini, A. and Pedersen, L.H., 2014. Betting against beta. Journal of Financial Economics, 111(1), pp.1-25.

Griffin, J.M. and Xu, J., 2009. How smart are the smart guys? A unique view from hedge fund stock holdings. Review of Financial Studies, 22(7), pp.2531-2570.

Grinblatt, M., Titman, S. and Wermers, R., 1995. Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior. The American economic review, pp.1088-1105.

Grossman, S.J. and Stiglitz, J.E., 1980. On the impossibility of informationally efficient markets. The American economic review, 70(3), pp.393-408.

Grossman, S.J., 1981. An introduction to the theory of rational expectations under asymmetric information. The Review of Economic Studies, 48(4), pp.541-559.

Jank, S. and Smajlbegovic, E., 2016. Dissecting short-sale performance: Evidence from large position disclosures. Deutsche Bundesbank Discussion Paper.

Joenväärä, J., Kosowski, R. and Tolonen, P., 2016. Hedge fund performance: What do we know?. SSRN Working Paper.

Rapach, D.E., Ringgenberg, M.C. and Zhou, G., 2016. Short interest and aggregate stock returns. Journal of Financial Economics, 121(1), pp.46-65.

Saffi, P.A. and Sigurdsson, K., 2010. Price efficiency and short selling. Review of Financial Studies, 24(3), 821–852.

Shleifer, A. and Vishny, R.W., 1997. The limits of arbitrage. The Journal of Finance, 52(1), pp.35-55.

Stambaugh, R.F., Yu, J. and Yuan, Y., 2012. The short of it: Investor sentiment and anomalies. Journal of Financial Economics, 104(2), pp.288-302.

Stefanova, D., Siegmann, A. and Zamojski, M., 2014. Hedge Fund Innovation (No. 14-13). Luxembourg School of Finance, University of Luxembourg. SSRN Working Paper.

Data:

Bloomberg

Hedge fund strategy data

EU Article 9 of Regulation No 236/2012

http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012R0236

FIN-FSA data of significant short positions

http://www.finanssivalvonta.fi/fi/Valvonta/Markkinavalvonta/Lyhyet_positiot/Positiot/Pages/Positiot.aspx

Kenneth French's data library

Risk free rate, FF3 + Carhart momentum portfolio returns

http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Lipper-Tass hedge fund database

Hedge fund strategy data

Thomson Reuters

Market return (Finnish return index), company specific returns